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FILE 'CAPLUS' ENTERED AT 13:08:50 ON 31 OCT 2003

L1 1 (SOLID (3A) DISPERSION) AND ("HIGH THROUGHPUT" OR COMBINATOR?) AND (POLYMER? POLYETHYLENE? OR POLYVINYL-PYRROLIDONE?)

L2 1 (SOLID (3A) DISPERSION) AND ("HIGH THROUGHPUT" OR COMBINATOR?) AND MICROSCOP?

L3 151 (SOLID (3A) DISPERSION) AND MICROSCOP?

L4 15 L3 AND FILM?

> d l4 ibib abs 1-15

L4 ANSWER 1 OF 15 CAPLUS COPYRIGHT 2003 ACS on STN

ACCESSION NUMBER: 2003:235818 CAPLUS

DOCUMENT NUMBER: 139:202603

TITLE: *Drug-Carrier screening on a chip*

AUTHOR(S): *Lee, Tu; Lee, Jia*

CORPORATE SOURCE: *Fresh Meadows, NY, 11365, USA*

SOURCE: *Pharmaceutical Technology North America (2003), 27(1), 40, 42, 44, 46, 48*

CODEN: PTNABQ; ISSN: 1534-2131

PUBLISHER: Advanstar Communications, Inc.

DOCUMENT TYPE: Journal

LANGUAGE: English

AB In this article the authors discuss the development of a rapid screening technol. based on the integration of spin-on and optical microscopy. This method was tested on 4 solid dispersion systems, and the spin-on films of each of these systems with various drug-carrier ratios at 25.degree.C were examd. by optical microscopy. The results of these expts. showed that drug-carrier screening on a chip had a fast solvent-removal rate by spinning (3-10 s) and a short image-acquisition time by optical microscopy (1-2 min), thereby proving this approach to be suitable for the accelerated development of new solid dispersion materials. REFERENCE COUNT: 29

L4 ANSWER 2 OF 15 CAPLUS COPYRIGHT 2003 ACS on STN

ACCESSION NUMBER: 2000:802581 CAPLUS

DOCUMENT NUMBER: 135:9871

TITLE: *Solid dispersion method for controlled medicine release Part. 1 Sustained release of a highly water-soluble medicine by polymer blending technique and release mechanism*

AUTHOR(S): *Fuase, Hiroshi; Ozeki, Tetsuya*

CORPORATE SOURCE: *Laboratory of Medical and Pharmacerutical Technology, School of Pharmacy, Tokyo University of Pharmacy and Life Science, Horinouchi, Hachioji, Tokyo, 192-0392, Japan*

SOURCE: *Pharm Tech Japan (1999), 15(7), 993-996, 999-1002, 1005-1009*

CODEN: PTJAE9; ISSN: 0910-4739

PUBLISHER: Yakugyo Jihosha

DOCUMENT TYPE: Journal; General Review

LANGUAGE: Japanese

AB A review with 32 refs. The solid dispersion technique is one of greatly useful idea in pharmaceutical field and is usually used to improve the dissoln. properties and bioavailability of poorly water-sol. drugs by dispersing them into water-sol. carriers. This review describes an application of the solid dispersion method to the controlled release of an extremely high water-sol. medicine (oxprenolol hydrochloride; OXP) by polymer blending technique. Water-insol. Et cellulose (EC) and water-sol. hydroxypropylcellulose (HPC) were used as polymer carriers. Effects of compn. ratio and polymer mol. wt. on medicine release and the release mechanism were studied. The release of OXP from the OXP-EC-HPC system was markedly suppressed at the HPC compn. ratio of 5-10% because OXP diffused into the HPC hydrogel phase formed and retained in the EC matrix. The effect of EC mol. wt. was hardly obsd. in the OXP-EC system, whereas the release rate of OXP was obviously varied depending on EC mol. wt. in the OXP-EC-HPC system, showing that it is feasible to control of OXP release. The bulk viscosity of HPC hydrogels markedly increased with the increasing HPC mol. wt. but there was little noticeable change in release rate and activation energy for OXP diffusion. This is because the microscopic viscosity was hardly affected by HPC mol. wt., suggesting that the resistance of OXP diffusion into the HPC hydrogels was almost the same. Further, the application of the solid dispersion system to the buccal mucosa-adhesive film for the clin. use was shown.

L4 ANSWER 3 OF 15 CAPLUS COPYRIGHT 2003 ACS on STN

ACCESSION NUMBER: 2000:39937 CAPLUS

DOCUMENT NUMBER: 133:5893

TITLE: "The effects of ambient cure-conditions on the coalescence and morphology of waterborne epoxy systems"

AUTHOR(S): *Galgoci, Ernest C.; Komar, Pratap C.; Denley, David R.*

CORPORATE SOURCE: Shell Chemical Company, Houston, TX, 77251-1380, USA

SOURCE: **Proceedings of the International Waterborne, High-Solids, and Powder Coatings Symposium (1999), 26th, 486-501**

CODEN: PIWCF4

PUBLISHER: University of Southern Mississippi, Dep. of Polymer Science

DOCUMENT TYPE: Journal

LANGUAGE: English

AB Waterborne epoxy systems continue to gain popularity for use in a variety of coating applications. However, the general acceptance of the technol. has suffered from the perception that those systems are sensitive to extreme relative humidity (RH) conditions during application and drying. To more fully understand how these conditions affect the drying process and the resultant film morphol. and appearance, clear and pigmented films were prepd. from two types of waterborne epoxy systems under a wide range of RHs. These systems included: a com. available std. based on a solid epoxy dispersion cured with a water-sol. amine; and a recently developed system comprised of a solid epoxy dispersion and an amine-functional curing agent dispersion. Visual observations were made of the drying of the clear systems at the various RHs, and at. force microscopy (AFM) techniques were employed to observe and compare the film

morphologies of the two clear systems. The pigmented films were used to monitor gloss and hardness. Both systems produced clear films even at RHs up to 92%. AFM evaluations showed coating morphol. variations dependent on the RH. Interestingly, the new system was less sensitive to RH conditions than the com. std.

REFERENCE COUNT: 10

L4 ANSWER 4 OF 15 CAPLUS COPYRIGHT 2003 ACS on STN

ACCESSION NUMBER: 1998:531929 CAPLUS

DOCUMENT NUMBER: 129:261198

TITLE: "Synthesis, characterization and film formation of fluorine-containing polyacrylate dispersions and their blends"

AUTHOR(S): *Linemann, R.; Malner, T.; Brandsch, R.; Bar, G.; Mulhaupt, R.*

CORPORATE SOURCE: Freiburger Materialforschungszentrum, Inst. Fur Makromolekulare Chemie, Freiburg, D-79104, Germany

SOURCE: **Polymer Preprints (American Chemical Society, Division of Polymer Chemistry) (1998), 39(2), 966-967**

CODEN: ACPPAY; ISSN: 0032-3934

PUBLISHER: American Chemical Society, Division of Polymer Chemistry

DOCUMENT TYPE: Journal

LANGUAGE: English

AB Stable, transparent, fluorine-contg. dispersions with a solids content of up to 27 wt.% were prepd. by emulsion polymn. of perfluorooctylethyl methacrylate (FMA) and perfluorooctylethyl acrylate (FA). The polymn. of the monomers with the emulsifier octadecyltrimethylammonium bromide and the initiator 2,2'-azobis(2- amidinopropane) dihydrochloride (V-50) showed a strong dependence of the conversion and kinetics on the acetone content, with an optimum for 19-26 wt.% acetone content. The film formation of the FMA/FA model dispersions and their blends with Bu methacrylate polymer dispersions on cotton fabrics was investigated by tapping mode at. force microscopy (TMAFM) with phase imaging. The compositional TMAFM maps showed the local distribution of the fluorine-contg. particles exhibiting their sepn. and enrichment at the film-air interface.

REFERENCE COUNT: 7

L4 ANSWER 5 OF 15 CAPLUS COPYRIGHT 2003 ACS on STN

ACCESSION NUMBER: 1998:528177 CAPLUS

TITLE: Synthesis, characterization and film formation of fluorine-containing polyacrylate dispersions and their blends.

AUTHOR(S): *Bar, G.; Linemann, R.; Malner, T.; Brandsch, R.; Muelhaupt, R.*

CORPORATE SOURCE: Freiburger Materialforschungszentrum, Institut fur Makromolekulare Chemie, Freiburg, D-79104, Germany

SOURCE: Book of Abstracts, 216th ACS National Meeting, Boston, August 23-27 (1998), POLY-466. American Chemical Society: Washington, D. C.

CODEN: 66KYA2

DOCUMENT TYPE: Conference; Meeting Abstract

LANGUAGE: English

AB Stable, transparent, fluorine-contg. dispersions with a solid content up to 27 wt% were prepd. by emulsion polymn. of perfluorooctylethylmethacrylate (FMA) and perfluorooctylethylacrylate (FA). The polymn. of the monomers with the emulsifier octadecyltrimethylammoniumbromide and the initiator 2,2'-azobis(2-amidinopropane)dihydrochloride (V-50) showed a strong dependence of the conversion and kinetics on the acetone content, with an optimum for 19-26 wt% acetone content. The film formation of the FMA/FA model dispersions and their blends with n-butylmethacrylate dispersions was investigated by tapping mode at. force microscopy (TMAFM) with phase imaging. The compositional TMAFM maps showed the local distribution of the fluorinecontaining particles exhibiting their sepn. and enrichment at the film-air interface.

L4 ANSWER 6 OF 15 CAPLUS COPYRIGHT 2003 ACS on STN

ACCESSION NUMBER: 1998:51958 CAPLUS

DOCUMENT NUMBER: 128:66777

TITLE: Superspreading of Aqueous Films Containing Trisiloxane Surfactant on Mineral Oil

AUTHOR(S): Stoebe, T.; Lin, Zuxuan; Hill, Randal M.; Ward, Michael D.; Davis, H. Ted

CORPORATE SOURCE: Department of Chemical Engineering and Materials Science, University of Minnesota, Minneapolis, MN, 55455, USA

SOURCE: Langmuir (1997), 13(26), 7282-7286

CODEN: LANGD5; ISSN: 0743-7463

PUBLISHER: American Chemical Society

DOCUMENT TYPE: Journal

LANGUAGE: English

AB The spreading of water droplets, contg. various surfactants, on liquid mineral oil surfaces has been investigated. Only "superspreading" trisiloxane surfactants were obsd. to promote rapid spreading on mineral oil, and the spreading characteristics of these systems differ substantially from those obsd. on solid substrates of comparable hydrophobicity. These differences include significantly faster spreading rates and monotonically increasing spreading rates with increasing surfactant concn. Superspreading is attributed to Marangoni flow along the mineral oil-water interface. The extremely fast spreading on the mineral oil surface, as compared to hydrophobic solid surfaces, is attributed to the absence of the no-slip condition at the mineral oil-water interface. Real-time video microscopy of the spreading of aq. droplets contg. the trisiloxane surfactant M(D'E4OH)M revealed stepwise motion of the leading edges of the aq. drop driven by disintegration of large surfactant aggregates at the mineral oil-water interface. This observation suggests that disintegrating aggregates instantaneously deliver large amts. of surfactant to the mineral oil-water interface, creating large surface tension gradients that are required for Marangoni flow. These results imply an important role of aggregate disintegration during the spreading of surfactant dispersions on hydrophobic solid substrates.

REFERENCE COUNT: 18

L4 ANSWER 7 OF 15 CAPLUS COPYRIGHT 2003 ACS on STN

ACCESSION NUMBER: 1995:977156 CAPLUS

DOCUMENT NUMBER: 124:66475

TITLE: Preparation of controlled-release coevaporates of dipyridamole by loading neutral pellets in a fluidized-bed coating system

AUTHOR(S): Beten, Deniz B.; Amighi, Karim; Moees, Andre J.

CORPORATE SOURCE: Laboratoire Pharmacie Galenique Biopharmacie, Universite Libre Bruxelles, Brussels, 1050, Belg.

SOURCE: Pharmaceutical Research (1995), 12(9), 1269-72

CODEN: PHREEB; ISSN: 0724-8741

PUBLISHER: Plenum

DOCUMENT TYPE: Journal

LANGUAGE: English

AB It is possible to prep. controlled-release drug-polymer coevaporates on an industrial scale, omitting the recovery problems and the milling and the sieving processes encountered when coevaporates are prepd. by the conventional solvent-evapn. technique. Controlled-release coevaporates were prepd. by spraying org. solns. of dipyridamole-Eudragit blends onto neutral pellets using the fluidized-bed coating method. Enteric acrylic polymers Eudragit L100-55, L, and S were used as dispersing agents and drug/polymer ratio 2:8 was selected for all formulations. Polarized light microscopy, X-ray diffraction spectroscopy, and differential scanning calorimetry were used to det. whether the drug was amorphous or cryst. in the coating films. Moreover, in vitro dissoln. tests were performed on the dipyridamole coated pellets in test media simulating the pH variations in the GI tract and the results were compared to the release data obtained from coevaporates prepd. by the conventional solvent-evapn. method. All the results clearly indicate that dipyridamole is amorphous in the coating films deposited on the neutral pellets as well as in coevaporate particles obtained by the conventional solvent-evapn. method. When the release patterns of the dipyridamole coated pellets are compared to those of the drug coevaporate particles prepd. with the same enteric acrylic polymers, the results show similar dissoln. trends. The results obtained indicate that pelletization can be considered as a method of choice for pilot plant and/or full-scale prodn. of controlled-release dosage forms based on the formation of amorphous solid dispersions.

L4 ANSWER 8 OF 15 CAPLUS COPYRIGHT 2003 ACS on STN

ACCESSION NUMBER: 1995:531577 CAPLUS

DOCUMENT NUMBER: 122:296848

TITLE: Gold nanocomposites

AUTHOR(S): Maya, L.; Allen, W. R.; Glover, A. L.; Mabon, J. C.

CORPORATE SOURCE: Chem. Analytical Sci. Div., Oak Ridge Natl. Lab., Oak Ridge, TN, 37831-6119, USA

SOURCE: Journal of Vacuum Science & Technology, B: Microelectronics and Nanometer Structures (1995), 13(2), 361-5

CODEN: JVTBD9; ISSN: 0734-211X

PUBLISHER: American Institute of Physics

DOCUMENT TYPE: Journal

LANGUAGE: English

AB A series of nanocomposites, finely divided gold dispersions in solid ceramic matrixes, were generated by reactive sputtering of gold alloys in a nitrogen plasma. Gold alloys examd. were different compns. of Au-Ga, Au-Al, and Au-Si. The av. size of the gold particles was in the range of 3-8 nm. These nanocomposites show interesting chem. characteristics as well as optoelectronic properties. The gold/gallium nitride composite is particularly interesting since GaN is a wide band semiconductor. The gallium nitride composite is also interesting because upon heating at 800.degree.C the material releases nitrogen and produces a gold-gallium alloy. This property was exploited to generate microscopic metal lines by maskless laser writing and its use explored for brazing ceramic and metal components. The resistivity of the Au/GaN nanocomposite films varied several orders of magnitude depending on the gold loading.

L4 ANSWER 9 OF 15 CAPLUS COPYRIGHT 2003 ACS on STN

ACCESSION NUMBER: 1994:657960 CAPLUS

DOCUMENT NUMBER: 121:257960

TITLE: High-solids nonaqueous dispersion coatings based on crystalline oligoesters

AUTHOR(S): Teng, Ganghui; Jones, Frank N.

CORPORATE SOURCE: North Dakota State Univ., ND, USA

SOURCE: Journal of Coatings Technology (1994), 66(829), 31-7

CODEN: JCTEDL; ISSN: 0361-8773

DOCUMENT TYPE: Journal

LANGUAGE: English

AB Nonaq. dispersions (NADs) of a cryst. oligoester diol were prepd. by crystn. in a medium consisting of amorphous diol, reactive diluent (RD), and a solvent. The cryst. diol (6GT) was prepd. from terephthalic acid and 1,6-hexanediol; RD was prepd. from terephthalic acid and glycidyl neodecanoate. The dispersions are opaque, thixotropic liqs. with low viscosities of solids of 60-70 wt%. X-ray and calorimetry studies show that the dispersed particles are cryst. Microscopy shows that they have a narrow distribution of diams., varying from 5 to 20 .mu.m depending on process conditions. When formulated with crosslinkers (melamine or isocyanate resins) and baked at temps. above the m.p. of the cryst. diol, these NADs gave transparent coatings. Glossy pigmented coatings were also prepd. As high solids coating, these materials provide excellent application properties (resistance to sagging) and a good balance of film phys. properties. While some of the formulated coatings stratify on standing, they can be restored to homogeneous, free-flowing liqs. by stirring gently.

L4 ANSWER 10 OF 15 CAPLUS COPYRIGHT 2003 ACS on STN

ACCESSION NUMBER: 1983:560029 CAPLUS

DOCUMENT NUMBER: 99:160029

TITLE: PTFE powdered resins containing pigments employing ammonium carbonate or ammonium bicarbonate

INVENTOR(S): Tsakumis, Theodore G.

PATENT ASSIGNEE(S): du Pont de Nemours, E. I., and Co., USA

SOURCE: U.S., 3 pp.

CODEN: USXXAM

DOCUMENT TYPE: Patent
LANGUAGE: English
PATENT NO. KIND DATE APPLICATION NO. DATE

US 4397980 A 19830809 US 1982-419545 19820917
EP 104060 A1 19840328 EP 1983-305423 19830915
EP 104060 B1 19860226
JP 59135228 A2 19840803 JP 1983-169515 19830916
JP 60054970 B4 19851203

PRIORITY APPLN. INFO.: US 1982-419545 19820917

AB Pigments are uniformly dispersed without agglomeration in poly(tetrafluoroethylene) (I) [9002-84-0] with the aid of $(\text{NH}_4)_2\text{CO}_3$ or NH_4HCO_3 . Thus, 37.2 g 50-50 mixt. of NH_4HCO_3 and yellow pigment Krolar 4-787D [81209-53-2] was added to 18 L 18% solids l aq. dispersion at 23.degree.. The mixt. was stirred 8.5 min at 400 rpm, and the particles were coagulated and dried to a fine powder. The powder was molded by sintering into films at 380.degree. at 10,000 psi. Microscopic examn. showed the pigment to be well dispersed with no large clumps visible.

L4 ANSWER 11 OF 15 CAPLUS COPYRIGHT 2003 ACS on STN

ACCESSION NUMBER: 1982:183862 CAPLUS

DOCUMENT NUMBER: 96:183862

TITLE: Dynamics of solid dispersions in oil during the lubrication of point contacts, Part II- Molybdenum disulfide

AUTHOR(S): Cusano, C.; Sliney, H. E.

CORPORATE SOURCE: Univ. Illinois, Urbana, IL, 61801, USA

SOURCE: ASLE Transactions (1982), 25(2), 190-7

CODEN: ASLTA2; ISSN: 0569-8197

DOCUMENT TYPE: Journal

LANGUAGE: English

AB The lubrication (by MoS₂ dispersed in mineral oil) of the Hertzian contact of a polished steel ball in contact with the flat surface of a glass disk was obsd. by optical microscopy. The MoS₂ enters the contact and forms a film on the contacting surfaces whenever a rolling component of motion is used, but not under pure sliding conditions. MoS₂ has a more pronounced plastic-flow behavior than graphite, but the steel ball is more readily scratched by MoS₂. The coeff. of friction is lower at higher sliding speeds or if the dispersed MoS₂ is absent. The amt. of wear is increased by coarseness in the MoS₂.

L4 ANSWER 12 OF 15 CAPLUS COPYRIGHT 2003 ACS on STN

ACCESSION NUMBER: 1968:478558 CAPLUS

DOCUMENT NUMBER: 69:78558

TITLE: Wax dispersion

PATENT ASSIGNEE(S): FMC Corp.

SOURCE: Brit., 6 pp.

CODEN: BRXXAA

DOCUMENT TYPE: Patent

LANGUAGE: English
PATENT NO. KIND DATE APPLICATION NO. DATE

GB 1122354 19680807

DE 1594437 DE

PRIORITY APPLN. INFO.: US 19651229

AB An oil-in-water aq. wax dispersion, with improved stability, is prepd. by mixing an aq. dispersion of org. particles consisting mainly of .beta.-1,4-glucan (I) or its derivs. and a normally solid wax material in a fluid state. Thus, an aq. dispersion of finely divided cellulose contg. mainly I was prepd. by subjecting regenerated cellulose film fragments to boiling 2.5N HCl for 15 min., filtering, and washing with water until neutral. The resulting wet cake was mixed with water at 100.degree. in a blender producing several dispersions of varying solids content to which was added paraffin wax at 75-85.degree. with agitation. The agitation was slowed and the mixt. cooled to <50.degree. Microscopic examn. showed all wax particles <20 .mu. and most <5 .mu.. Several aq. dispersions were prepd. contg. various proportions of wax and cellulose and those with .ltoreq.4% wax content were used to coat metal, paper, and glass. The dispersions displayed improved resistance to temp. as well as acid and base when compared to a typical com. wax emulsion. Carnauba wax was also used in place of paraffin. Attempts to substitute com. silica or bentonite in place of the divided cellulose were unsuccessful.

L4 ANSWER 13 OF 15 CAPLUS COPYRIGHT 2003 ACS on STN

ACCESSION NUMBER: 1966:94556 CAPLUS

DOCUMENT NUMBER: 64:94556

ORIGINAL REFERENCE NO.: 64:17863f-h,17864a-d

TITLE: Relations between pigment/binder interaction and the water absorption of solid paint films

AUTHOR(S): Funke, W.; Zorll, U.; Elser, W.

CORPORATE SOURCE: Forschungsinst. Pigmente Lacke e.V., Stuttgart, Germany

SOURCE: Farbe + Lack (1966), 72(4), 311-22

CODEN: FALAAA; ISSN: 0014-7699

DOCUMENT TYPE: Journal

LANGUAGE: German

AB Interactions between pigments and binders det. the degree and permanency of dispersions of solid particles in the liquid phases and affect the viscosity, ease of application, and sagging of paint formulations. In the solid coatings, "active" pigments reinforce the strength of the films through selective adsorption at polyvalent coordination sites. Similar forces det. the viscoelastic properties of paints. Recent studies have shown the existence of some qual. relations between the H2O-absorption capacity of coatings and physicochem. interactions of their pigment and binder components (CA 57, 15270c); there is no agreement, however, on the validity of such relations. Osmosis-caused increased water absorption was observed for poly(Bu methacrylate) films pigmented with a red H2O-sol. azo dye. For urea-HCHO resins, the H2O absorptivity was independent of the pigment vol. concn. The conclusion that the pigment/binder cohesion is not affected by H2O was confirmed electron microscopically. ZnO/epoxide resin interactions, however, were weakened by H2O. Accordingly, the H2O absorption

capacity increased with increasing pigment vol. concn. and exhibited, in the case of an alkyd resin, even a marked max. The decreasing H₂O absorption at very high pigment vol. concns. is explained by the continuously narrowing distance of pigment particles. Consequently, a relation exists between the exact position of the max. and the particle size of the pigment. The height of the max. is dependent on the concn. or H₂O-sol. moieties in the resin or pigments, on the distribution of the pigment particles, and on the duration of the exposure of the film to H₂O. The width of the max. is related to the state of flocculation of the pigment particles. The theory of osmotic interferences advanced above requires that the absorption max. occur only above the glass-transition temp. This could be confirmed exptl. with poly(Bu methacrylate), glass transition 26-30.degree., pigmented with PbNO₃. Permanently remaining pigment/ binder adsorptions such as observed for urea-formaldehyde resins pigmented with ZnO show a decreasing H₂O-vapor permeability with increasing pigment vol. concn. because the diffusion is restricted to passing through the binder layers. If there is no permanency in the pigment/binder cohesion, then H₂O may permeate preferentially along the pigment surfaces and the H₂O permeability increases with increasing pigment vol. concn. A similar relation results if the diffusion is promoted by the presence of binder-free cavities in pigment flocculates. This could be verified exptl. with plasticized, TiO₂-pigmented poly(Bu methacrylate). Poor pigment/binder cohesion was demonstrated with ZnO-pigmented alkyd resins. The H₂O permeability was detd. by means of modified Payne-cups and the results with regard to the strengths of pigment/binder interactions correlated satisfactorily with those obtained from sorption measurements if appropriate allowances are made for the differing exptl. conditions. The results indicate that besides the crit. pigment vol. concn. at which the packing d. of the pigment particles attains a max., there is a 2nd crit. point in the region of low pigment vol. concns. at which the pigment particles with low coordination nos. come into contact with each other without maximizing the space utilization. At this point several paint characteristics, such as the H₂O absorption capacity, the f.p., the hiding capacity, and the diffusion coeff. may change abruptly. The recognition and evaluation of these relations render the swelling capacity and the H₂O absorptivity of coatings suitable for characterizing paint formulations.

L4 ANSWER 14 OF 15 CAPLUS COPYRIGHT 2003 ACS on STN

ACCESSION NUMBER: 1965:407537 CAPLUS

DOCUMENT NUMBER: 63:7537

ORIGINAL REFERENCE NO.: 63:1334c-f

TITLE: Production and structure of solid, finely dispersed metals for spectral investigation

AUTHOR(S): Kavtaradze, N. N.; Sokolova, N. P.; Luk'yanovich, V. M.; Evko, E. I.

SOURCE: Kinetika i Kataliz (1964), 5(6), 1095-9

CODEN: KNKTA4; ISSN: 0453-8811

DOCUMENT TYPE: Journal

LANGUAGE: Russian

AB Solid dispersions were prepd. on highly dispersed silica (Aerosil) with a sp. surface area of 170 m.²/g., or on Al₂O₃ with 101.6 m.²/g. fired preliminarily at 550-600.degree. for 6 hrs. The powders were impregnated with aq. solns. of Cu(NO₃)₂. Batches were dried at 60-70.degree. and ground suspensions of 100 mg. were prepd. and disks were

pressed 28 mm. in diam. The disks were placed in a vacuum cuvette, evacuated, and heated to 100.degree.; then they were reduced by H at 350.degree. and 100 torr; then they were degassed to $<1 \times 10^{-6}$ torr and cooled to the required temp. The characteristics are tabulated. The ir spectra of vapors and gases adsorbed on metals can be obtained by multiple reflection from the mirror surface of the metals filled with adsorbed gas or by passing radiation through powderlike samples of a metal contg. a large no. of interfaces covered by a layer of adsorbed mols. The structure of pressed samples of solid dispersions applied to Al_2O_3 or SiO_2 was detd. by x-ray structural and electron- microscopic methods. The x-ray method showed that the sizes of the Cu, Ag, Au, Pd, and Co particles were 140-250 A. at 8-12% of these metals in the dispersions. For electron-microscopic study, the metal dispersions were stirred in water and a drop of the suspension was placed on a colloidal supporting film. After evapn. of the water the prepn. was studied under the microscope. The resolving power of the UEMB-100 microscope was 10-15 A., and photographs were made at a magnification of 25,000 diams. The particles of Au and Cu were homogeneous, with sizes of 80-100 A.; Ag particles were polydispersed with particle size 250 A., but sometimes attaining 800 A. The distribution curves of the metal particles are asym. With increasing polydispersion, the max. are shifted to the right. It is possible that they can be described by the same function which cannot be, however, the sq. formula of Gauss. 23 references.

L4 ANSWER 15 OF 15 CAPLUS COPYRIGHT 2003 ACS on STN

ACCESSION NUMBER: 1946:17610 CAPLUS

DOCUMENT NUMBER: 40:17610

ORIGINAL REFERENCE NO.: 40:3383d-f

TITLE: Electron metallographic methods and some results for magnesium alloys

AUTHOR(S): Heidenreich, R. D.; Gerould, Ch. H.; McNulty, R. E.

SOURCE: Trans. Am. Inst. Mining Met. Engrs., Inst. Metals Div., Tech. Pub. (1946), No. 1979, 22 pp.

DOCUMENT TYPE: Journal

LANGUAGE: Unavailable

AB A new etching (MeI) and rinse procedure has been developed for Mg alloys, which yields in contrast to standard etchants, a surface free of films and mech. distortion. The surface resulting from this etchant can be examd. in the electron microscope by use of the polystyrene-silica replica technique, or by reflection electron-diffraction methods. The MeI etchant gives, in the electron microscope, results that are not only consistent with those observed in the light microscope, but also much addnl. detail. In a study of Mg-Al solid solns., a new dispersion of an Fe-Al phase has been discovered. This dispersion, called "fine structure," is important in understanding both stress and general corrosion processes for Mg-Al alloys of controlled purity.

FILE 'CAPLUS' ENTERED AT 18:57:34 ON 31 OCT 2003

L1 553 KARIM A?/AU

L2 182 L1 AND (COMBINATOR? OR POLYMER? OR "HIGH THROUGHPUT" OR FILM?)

L3 34 L2 AND SILICON

L4 11 L1 AND DISSOLUT?

L5 15797 DISSOLV? (S) PHASE?
L6 21 (COMBINATOR? OR "HIGH THROUGHPUT") (S) DISSOL?
L7 2200 DISSOL? (S) MICROSCOP?
L8 108 L7 AND SILICON
L9 30 L8 AND PHASE?

> d l3 ibib abs 1-34

L3 ANSWER 1 OF 34 CAPLUS COPYRIGHT 2003 ACS on STN

ACCESSION NUMBER: 2003:294474 CAPLUS

DOCUMENT NUMBER: 139:69848

TITLE: Combinatorial investigations of interfacial failure

AUTHOR(S): Crosby, Alfred J.; Karim, Alamgir; Amis, Eric J.

CORPORATE SOURCE: Polymers Division, National Institute of Standards and Technology, Gaithersburg, MD, 20899, USA

SOURCE: Journal of Polymer Science, Part B: Polymer Physics (2003), 41(9), 883-891

CODEN: JPBPEM; ISSN: 0887-6266

PUBLISHER: John Wiley & Sons, Inc.

DOCUMENT TYPE: Journal

LANGUAGE: English

AB Conventional measurements of interfacial strength of adhesive materials focus on a single variable, whereas many variables couple nontrivially and simultaneously to define this property. A combinatorial methodol. was implemented that allows the effects of multivariable environments on interfacial strength to be studied in a high- throughput, parallel, and quant. manner. This technique is largely based on the theory of K. Johnson, K. Kendall, and A. Roberts (1971) that quantifies adhesion through the contact and sepn. of a spherical microlens and flat substrate from optical microscopy images at different times. A combinatorial library was fabricated consisting of a two-dimensional array of spherical caps and a complementary substrate. The array of spherical caps was brought into contact and subsequently sepd. from the substrate, whereas the relative displacement and contact area of the individual lenses were recorded. With gradient library-fabrication methods, two adhesion-controlling parameters can be continuously varied along the orthogonal axes of the array. In this manner, each lens quantifies the interfacial strength at a unique point in parameter space. This multilens contact-adhesion test was demonstrated by measuring the effect of temp. and coating thickness on the self-adhesion of polystyrene thin films and the adhesive strength of polystyrene - poly(dimethylsiloxane) (PDMS) microlens interfaces.

REFERENCE COUNT: 29

L3 ANSWER 2 OF 34 CAPLUS COPYRIGHT 2003 ACS on STN

ACCESSION NUMBER: 2003:160208 CAPLUS

DOCUMENT NUMBER: 138:369499

TITLE: Combinatorial mapping of surface energy effects on diblock copolymer thin film ordering

AUTHOR(S): Smith, Archie P.; Sehgal, Amit; Douglas, Jack F.; Karim, Alamgir; Amis, Eric J.

CORPORATE SOURCE: Polymers Division, National Institute of Standards and Technology, Gaithersburg, MD, 20899, USA

SOURCE: Macromolecular Rapid Communications (2003), 24(1), 131-135

CODEN: MRCOE3; ISSN: 1022-1336

PUBLISHER: Wiley-VCH Verlag GmbH & Co. KGaA

DOCUMENT TYPE: Journal

LANGUAGE: English

AB Combinatorial gradient techniques were used to map the morphol. dependence of thin sym. styrene-Me methacrylate diblock copolymer films on film thickness and substrate surface energy. The substrate is Si wafer chem. modified with octyldimethylchlorosilane self-assembled monolayer and exposed to UV/ozone in a graded oxidative process to create the gradient surface chem. moieties, hence gradient surface energies. An inversion from sym. to anti-sym. lamellar morphol. occurs with a progressive change in surface energy. An intermediate neutral region was found between these limiting types of ordering. The width ω of this transitional energy range scales as a power of copolymer mass M , ω varies. $M^{1.9}$. Optical images of a combinatorial map of the thin-film block-copolymer morphol. on a thickness and surface energy gradient film show islands and holes on the surface which scatter light causing the film to appear cloudy (lighter in color) in those areas. The darker areas do not have surface features and do not scatter light. REFERENCE COUNT: 33

L3 ANSWER 3 OF 34 CAPLUS COPYRIGHT 2003 ACS on STN

ACCESSION NUMBER: 2002:952909 CAPLUS

DOCUMENT NUMBER: 138:272301

TITLE: "Combinatorial investigation of dewetting: polystyrene thin films on gradient hydrophilic surfaces"

AUTH.: Ashley, Karen M.; Carson Meredith, J.; Amis, Eric; Raghavan, D.; Karim, A.

CORPORATE SOURCE: Department of Chemistry, Polymer Division, Howard University, Washington, DC, 20059, USA

SOURCE: Polymer (2002), Volume Date 2003, 44(3), 769-772

CODEN: POLMAG; ISSN: 0032-3861

PUBLISHER: Elsevier Science Ltd.

DOCUMENT TYPE: Journal

LANGUAGE: English

AB Film stability and dewetting is important to control for applications in coatings such as photoresists, paints, adhesives, lubricants, and biomaterials. We demonstrate the use of 2D combinatorial libraries to investigate thin film dewetting. Substrate libraries with gradients in contact angle (θ) were prep'd. by immersing Si-H passivated Si in a Piranha soln. ($\text{H}_2\text{SO}_4/\text{H}_2\text{O}_2/\text{H}_2\text{O}$) at a controlled rate. Libraries of thin films of polystyrene on gradient etched silicon substrates contg. orthogonal continuous variation of thickness were screened for dewetting behavior using automated optical microscopy. After comparing the high-throughput screening method to conventional studies of thickness effect on dewetting, a detailed morphol. phase-map of the effects of contact angle on dewetting of polystyrene film was generated. Dewetting trends were visibly apparent. The no. of polygons of dewetted polymer is sensitive to surface hydrophilicity as characterized by contact angle studies. REFERENCE COUNT: 16

L3 ANSWER 4 OF 34 CAPLUS COPYRIGHT 2003 ACS on STN

ACCESSION NUMBER: 2002:786322 CAPLUS

DOCUMENT NUMBER: 138:45208

TITLE: Multifunctional ToF-SIMS: combinatorial mapping of gradient energy substrates

AUTHOR(S): Roberson, Sonya V.; Fahey, Albert J.; Sehgal, Amit; Karim, Alamgir

CORPORATE SOURCE: Surface and Microanalysis Science Division, National Institute of Standards and Technology, Gaithersburg, MD, 20899-8371, USA

SOURCE: Applied Surface Science (2002), 200(1-4), 150-164

CODEN: ASUSEE; ISSN: 0169-4332

PUBLISHER: Elsevier Science B.V.

DOCUMENT TYPE: Journal

LANGUAGE: English

AB We present a simple method for chem. modification of chlorosilane self-assembled monolayers (SAMs) on Si surfaces by exposure to a gradient of UV-ozone radiation to create stable substrates with a range of contact angles (θ_{H_2O} approx. 5-95 degree.) and surface energies on a single substrate. These gradient energy substrates are developed to potentially generate libraries for combinatorial studies of thin film phenomenol., where a systematic variation of interfacial surface energy represents one of the significant parameters along one axis. The graded oxidn. process presents a systematic variation of surface chem. compn. We have utilized contact angle measurements and time-of-flight secondary ion mass spectrometry (ToF-SIMS) to investigate this variation for a series of ions, among which are $SiCH_3^+$, $SiOH^+$ and $COOH^-$. We show that the macroscopic measurements of surface free energy/contact angle correlate with the detailed anal. of surface chem. (as assessed by ToF-SIMS) on these test substrates. REFERENCE COUNT: 27

L3 ANSWER 5 OF 34 CAPLUS COPYRIGHT 2003 ACS on STN

ACCESSION NUMBER: 2002:578502 CAPLUS

DOCUMENT NUMBER: 137:233576

TITLE: Pattern-Directed Dewetting of Ultrathin Polymer Films

AUTHOR(S): Sehgal, Amit; Ferreira, Vincent; Douglas, Jack F.; Amis, Eric J.; Karim, Alamgir

CORPORATE SOURCE: Polymers Division, National Institute of Standards and Technology, Gaithersburg, MD, 20899, USA

SOURCE: Langmuir (2002), 18(18), 7041-7048

CODEN: LANGD5; ISSN: 0743-7463

PUBLISHER: American Chemical Society

DOCUMENT TYPE: Journal

LANGUAGE: English

AB We utilize chem. patterned substrates with arrays of progressively narrower stripes (1-15 μm) to investigate the influence of pattern size on the morphol. of ultrathin dewetting polystyrene films. The scale and orientation of the spinodal-like height fluctuations of the dewetting patterns are coupled to the imposed substrate chem. frequency, providing a powerful means of morphol. control. Dewetting patterns are

correlated to the substrate pattern period leading to the formation of droplet arrays. The measurements confirm recent numerical simulations by Kargupta and Sharma of the existence of upper and lower cutoff scales for pattern recognition of a dewetting fluid. For pattern dimensions less than the characteristic scale on nonpatterned substrates, the droplets become anisotropic as they coarsen to a scale comparable to the stripe width, and then undergo a morphol. transition to circular droplets that cross multiple stripes. This leads to quantization of droplet size and contact angles, as indicated by theory.
REFERENCE COUNT: 34

L3 ANSWER 6 OF 34 CAPLUS COPYRIGHT 2003 ACS on STN

ACCESSION NUMBER: 2002:549209 CAPLUS

DOCUMENT NUMBER: 137:263692

TITLE: "Combinatorial mapping of polymer film wettability on gradient energy surfaces"

AUTHOR(S): Ashley, Karen; Seghal, A.; Amis, Eric J.; Raghavan, D.; Karim, A.

CORPORATE SOURCE: Polymer Division, Department of Chemistry, Howard University, Washington, DC, 20059, USA

SOURCE: Materials Research Society Symposium Proceedings (2002), 700 (Combinatorial and Artificial Intelligence Methods in Materials Science), 151-156

CODEN: MRSPDH; ISSN: 0272-9172

PUBLISHER: Materials Research Society

DOCUMENT TYPE: Journal

LANGUAGE: English

AB The use of combinatorial methods for studying dewetting of thin hydrophobic polystyrene (PS) and hydrophilic poly(D-lactic acid) (PDLA) films on chem. modified gradient energy surfaces was studied. Substrate libraries were prepd. by immersing Si-H (passivated Si) in Piranha soln. (H₂SO₄/H₂O₂/H₂O) at a controlled rate giving a systematic variation of solvent contact angles across the surface. Addnl., chlorosilane treated Si surfaces were exposed to UV radiation in a gradient fashion under ozone atm. such that a range from hydrophobic to hydrophilic was obtained across the surface (apprx. 3 cm). Multiple solvents (water and diiodo methane) were used to quantify the spatial variation of surface energy along one axis across the surface. Libraries of thin films of PS or PDLA coatings on gradient energy surfaces orthogonal to gradients in film thickness were screened for dewetting behavior using automated optical microscopy. Contrasting trends in the wettability of PS and PDLA were visibly apparent as a function of surface energy of the substrate. The no. d. of polygons of the dewet PS films was found to obey a power law relation with both film thickness and substrate surface hydrophilicity. REFERENCE COUNT: 12

L3 ANSWER 7 OF 34 CAPLUS COPYRIGHT 2003 ACS on STN

ACCESSION NUMBER: 2001:736361 CAPLUS

DOCUMENT NUMBER: 136:124131

TIT. Influence of nanoparticles and polymer branching on the dewetting of polymer films

AUTHOR(S): Barnes, K. A.; Douglas, J. F.; Liu, D.-W.; Karim, A.

CORPORATE SOURCE: Polymers Division, National Institute of Standards and Technology, Gaithersburg, MD, 20899, USA

SOURCE: Advances in Colloid and Interface Science (2001), 94(1-3), 83-104

CODEN: ACISB9; ISSN: 0001-8686

PUBLISHER: Elsevier Science B.V.

DOCUMENT TYPE: Journal

LANGUAGE: English

AB Previous studies showed that spun-cast films of unentangled synthetic polymers commonly dewet inorg. or org. substrates, leading to technol. detrimental results for many applications. The authors illustrate two strategies for influencing polymer film dewetting on inorg. and org. substrates. First, the addn. of small amts. of C60 fullerene nanoparticles to the spin-casting polymer solns. of model synthetic polymers [polystyrene (PS) and polybutadiene (PB)] leads to a significant inhibition of film dewetting on Si. This effect is assocd. with the formation of a diffuse fullerene layer near the solid substrate that frustrates the dewetting hole growth process. Next, the authors consider polymer branching effects on the dewetting of various generations of hypergraft polymer poly(2-ethyl-2-oxazoline) (PEOX) films cast on high mol. wt. polystyrene substrates. The early stage of dewetting is similar in a zeroth generation G0 hypergraft (a comb polymer) and a G2 hyper-graft (resembling a spherical 'micro-gel' particle). The late stage of dewetting in the G2 films, however, differs significantly from the low generation films because of an inhibition of hole coalescence in the intermediate stage of film dewetting. This behavior resembles previous observations of dewetting in 'entangled' polystyrene films. Thus, the viscoelasticity of the polymer film can have an inhibitory effect on film dewetting, leading to changes in the dewetted film morphol. rather than a suppression of film dewetting. REFERENCE COUNT: 46

L3 ANSWER 8 OF 34 CAPLUS COPYRIGHT 2003 ACS on STN

ACCESSION NUMBER: 2001:204340 CAPLUS

TITLE: "Combinatorial characterization of biodegradable polymers"

AUTHOR: *Meredith, J. Carson; Tona, Alex; Elgendy, Hoda; Karim, Alamgir; Amis, Eric*

CORPORATE SOURCE: School of Chemical Engineering, Georgia Institute of Technology, Atlanta, GA, 30332-0100, USA

SOUR: **Abstracts of Papers - American Chemical Society (2001), 221st, POLY-035**

CODEN: ACSRAL; ISSN: 0065-7727

PUBLISHER: American Chemical Society

DOCUMENT TYPE: Journal; Meeting Abstract

LANGUAGE: English

AB Characterization of biodegradable polymers for tissue engineering is complex since a large no. of compn. and processing variables interact to produce desired surface chem. and topog. Combinatorial methodologies allow efficient measurement over large regimes of variable space, but combinatorial polymer characterization has been limited by a shortage of techniques for prepg. libraries with systematically varied compn. (x) -and temp. (T). In this talk, combinatorial methods are presented for assaying cell adhesion and proliferation of as a function of x and anneal T on biodegradable polymers. We prepd. T-x combinatorial libraries of blends of poly(D,L-lactide) (PDLA) and poly(ϵ -caprolactone) (PCL), coated on a clean silicon wafer, 26x30 mm², with orthogonal gradients in blend compn., xPCL, and anneal T. Gradients in xPCL were created using a three-step film deposition process and anneal T gradients between 150 oC and 50 oC were created with a custom aluminum heating stage. UMR-106 cells were cultured on

annealed T-xPCL libraries for periods of 1 d and 5 d in DMEM medium supplemented with fetal bovine serum and antibiotics at 37 °C and 5 % CO₂. To assay cell proliferation and differentiation of osteoblast phenotype, cells were stained for alkaline phosphatase (ALP). The figure on the left below shows a T-x library after 5 d culture, in which ALP is preferentially expressed by cells at T and x conditions near or within the polymer blend LCST two-phase regime (white curve). In contrast, cells cultured concurrently at the same conditions on Thermanox slides (right figure below) show uniform adhesion and ALP expression. AFM indicates that cells preferentially express ALP when attached to surface features averaging 0.5 ± 0.2 μm in height. Cells did not adhere or proliferate well in areas with topog. features larger than 0.7 μm, smaller than 0.3 μm, or with mass fraction xPCL > 0.5. The combinatorial library techniques presented here allow rapid, efficient, and accurate exploration of the effects of polymer compn., microstructure, and topog. on cell adhesion and proliferation.

L3 ANSWER 9 OF 34 CAPLUS COPYRIGHT 2003 ACS on STN

ACCESSION NUMBER: 2001:101679 CAPLUS

DOCUMENT NUMBER: 134:296391

TITLE: Suppression of Lateral Phase Separation in Thin Polyolefin Blend Films

AUTHOR(S): Akpalu, Y. A.; Karim, A.; Satija, S. K.; Balsara, N. P.

CORPORATE SOURCE: Polymers Division, National Institute of Standards and Technology, Gaithersburg, MD, 20899-8542, USA

SOURCE: Macromolecules (2001), 34(6), 1720-1729

CODEN: MAMOBX; ISSN: 0024-9297

PUBLISHER: American Chemical Society

DOCUMENT TYPE: Journal

LANGUAGE: English

AB The effectiveness of a compatibilizer in suppressing lateral phase sepn. in thin polyolefin blend films is investigated as a function of film thickness and temp. Neutron and X-ray reflectivity measurements were made on spun-cast thin blend films of partially deuterated and hydrogenated polyolefin blends with and without diblock compatibilizer. We use an extended silicon surface passivating treatment. Under these biased sym. wetting conditions (air vs hydrophobic Si), binary blend films are stabilized against both dewetting from the substrate and roughening of the surface due to phase sepn. when the film thickness (apprx. 25 nm) is on the order of the mol. radius of gyration. However, thicker (apprx. 100 nm) films exhibit lateral phase sepn. that can be suppressed by the addn. of block copolymer compatibilizer. This stabilization effect can be attributed to the redn. of interfacial tension leading to a broadening of interfaces, and addnl., the presence of diblock copolymer in both phases alters their surface interactions. On longer time scales, optical micrographs show the development of large-scale features over the course of a year in the molecularly thin blend films and in the ternary thin film (stored under vacuum). A droplet morphol. is obsd. for molecularly thin blend films, and an interconnected domain structure characteristic of the early and intermediate stages of phase sepn. is obsd. for the ternary thin blend film. The phase sepd. structure obtained for the binary thin blend film does not evolve with time. Our results indicate that one also needs to account for kinetics in order to develop a comprehensive understanding of

the structure of thin blend films. In general, temp. has a weak effect on the profile development of compatibilized blend films.

REFERENCE COUNT: 49

L3 ANSWER 10 OF 34 CAPLUS COPYRIGHT 2003 ACS on STN

ACCESSION NUMBER: 2000:842516 CAPLUS

DOCUMENT NUMBER: 134:148101

TITLE: "Combinatorial Materials Science for Polymer Thin-Film Dewetting"

AUTHOR(S): Meredith, J. Carson; Smith, Archie P.; Karim, Alamgir; Amis, Eric J.

CORPORATE SOURCE: Polymers Division, National Institute of Standards and Technology, Gaithersburg, MD, 20899-8542, USA

SOURCE: **Macromolecules (2000), 33(26), 9747-9756**

CODEN: MAMOBX; ISSN: 0024-9297

PUBLISHER: American Chemical Society

DOCUMENT TYPE: Journal

LANGUAGE: English

AB Combinatorial methods involving data collection in multiparameter space allow a rapid identification of measured property trends as a function of system parameters. The technique was applied with success to pharmaceutical, inorg. and org. materials synthesis, but not significantly to measurements of polymeric films and coatings. The use of 2-D combinatorial libraries to study thin-film dewetting is demonstrated. Libraries were produced, of thin films of polystyrene on silicon substrates contg. orthogonal, continuous variations of thickness (h), and temp. (T) that represent about 1200 practical state points per library. The libraries were screened for dewetting behavior using automated optical microscopy. Dewetting trends were visibly apparent on the libraries, and a comprehensive map of the T, h, and time (t) dependence was generated in a few hours. The combinatorial libraries, spanning a large T, h, and t range, reproduced known dewetting structures and phenomena and enabled a novel T, h superposition of the heterogeneous nucleated hole dewetting kinetics. Three hole nucleation regimes were obsd. as a function of thickness: heterogeneously nucleated holes ($h > 55$ nm), a crossover regime where both heterogeneous and capillary instability nucleation compete ($33 \text{ nm} < h < 55 \text{ nm}$), and a regime of holes nucleated by capillary instability ($16 \text{ nm} < h < 33 \text{ nm}$).

REFERENCE COUNT: 40

L3 ANSWER 11 OF 34 CAPLUS COPYRIGHT 2003 ACS on STN

ACCESSION NUMBER: 2000:794487 CAPLUS

TITLE: High throughput dewetting of polystyrene on gradient etched silicon surfaces.

AUTHOR(S): Ashley, Karen; Raghavan, D.; Meredith, J. Carson; Karim, A.

CORPORATE SOURCE: Department of Chemistry, Howard University, Washington, DC, 20059, USA

SOURCE: Abstracts of Papers - American Chemical Society (2000), 220th, COLL-295

CODEN: ACSRAL; ISSN: 0065-7727

PUBLISHER: American Chemical Society

DOCUMENT TYPE: Journal; Meeting Abstract

LANGUAGE: English

AB The dewetting characteristic of thin polymer films (30 nm) on gradient-etched silicon substrates was examd. By etching Si substrates with a Piranha soln. (H₂SO₄/H₂O₂) while pulling the substrate out of the soln. at a controlled rate, a chem. varying gradient surface was formed. The surface chem. of Si surface was shown to vary from hydrophilic to hydrophobic regime using deionized water contact angle measurements. Low mol. wt. polystyrene (M_w=1800 g/mol) was coated on the gradient surface with velocity-gradient flow coating to produce a thickness gradient orthogonal to the surface energy gradient. The sample was annealed for 2 h at 100 oC before characterizing the dewetting process with optical microscopy and at. force microscopy. The late stage dewetting pattern type, size, and d. of structure depends sensitively on the chem. nature of the substrate. Studies are underway to relate dewetting pattern evolution to changes in film stability. The kinetics of dewetting is strongly dependent on hydrophilicity of the substrate.

L3 ANSWER 12 OF 34 CAPLUS COPYRIGHT 2003 ACS on STN

ACCESSION NUMBER: 2000:331957 CAPLUS

TITLE: "Combinatorial measurements for polymeric coatings."

AUTHOR(S): *Meredith, J. Carson; Karim, Alamgir; Amis, Eric J.*

CORPORATE SOURCE: Polymers Division, NIST, Gaithersburg, MD, 20878, USA

SOURCE: **Book of Abstracts, 219th ACS National Meeting, San Francisco, CA, March 26-30, 2000 (2000), MTL-003 American Chemical Society Washington, D. C.**

CODEN: 69CLAC

DOCUMENT TYPE: Conference; Meeting Abstract

LANGUAGE: English

AB Combinatorial methods are described for measuring two important fundamental properties of polymer thin films: the extent of wetting and phase behavior in blended films. In each case library creation, high-throughput measurements, and informatics are used to generate combinatorial maps of wettability and phase behavior. The temp. and film thickness dependence of the dewetting behavior of polystyrene on silicon is evaluated in combinatorial libraries in which thickness and temp. are varied systematically. Automated scanning optical microscopy is used to det. the time-temp.-thickness superposition of dewetting kinetics and to observe transitions between film stability regimes. By a similar methodol., the phase boundary for a polystyrene / poly(vinylmethyl ether) blend film is obsd. with compn.-temp. libraries. The combinatorial method is validated by comparison to previous results. The results show that high-throughput experimentation is useful not only for the discovery of new materials, but also for observation of fundamental materials properties.

L3 ANSWER 13 OF 34 CAPLUS COPYRIGHT 2003 ACS on STN

ACCESSION NUMBER: 2000:282120 CAPLUS

DOCUMENT NUMBER: 133:59442

TITLE: Suppression of Dewetting in Nanoparticle-Filled Polymer Films

AUTHOR(S): Barnes, Kathleen A.; Karim, Alamgir; Douglas, Jack F.; Nakatani, Alan I.; Gruell, Holger; Amis, Eric J.

CORPORATE SOURCE: Polymers Division, National Institute of Standards and Technology (NIST), Gaithersburg, MD, 20899, USA

SOURCE: *Macromolecules* (2000), 33(11), 4177-4185

CODEN: MAMOBX; ISSN: 0024-9297

PUBLISHER: American Chemical Society

DOCUMENT TYPE: Journal

LANGUAGE: English

AB The perturbing influence of nanosize filler particles on the dewetting of spun-cast polymer films was investigated. Previous studies have shown that spun-cast films of unentangled polystyrene (PS) and polybutadiene (PB) dewet acid-cleaned silicon wafers when the films are annealed above T_g . Also, impurity particles tend to promote dewetting in thin polymer films. Here we demonstrate that the addn. of a small amt. of C60-fullerene nanoparticles to the spin-casting polymer soln. leads to an inhibition of dewetting in thin (<100 nm) PS and PB films cast on both acid-cleaned and C-coated Si wafer substrates. Neutron reflection measurements indicate that this effect is assocd. with the formation of a diffuse fullerene layer near the solid substrate. Evidently, the immobilized fullerene particles form an enrichment layer at the solid boundary and pin the contact line of the growing dewetted (dry) regions so that hole growth in the filled films becomes arrested at a scale which diminishes with increasing filler concn. Above a relative filler-polymer mass fraction of 1%, we no longer observe hole formation on the time scales of our measurements (typically on the order of hours), suggesting the existence of a crit. filler surface coverage for the suppression of dewetting. The roughness of the fullerene layer probably also contributes to the modification of the surface wetting properties through a change in the surface energy of the substrate, as suggested by recent measurements on substrates roughened by other means such as irradiation of polymer film substrates, grafting of polymer chains, etc.

REFERENCE COUNT: 36

L3 ANSWER 14 OF 34 CAPLUS COPYRIGHT 2003 ACS on STN

ACCESSION NUMBER: 2000:173514 CAPLUS

DOCUMENT NUMBER: 132:323007

TITLE: "Mapping polymer heterogeneity using atomic force microscopy phase imaging and nanoscale indentation"

AUTHOR(S): *Raghavan, D.; Gu, X.; Nguyen, T.; VanLandingham, M.; Karim, A.*

CORPORATE SOURCE: Polymer Science Division Department of Chemistry,
Howard University, Washington, DC, 20059, USA

SOURCE: *Macromolecules* (2000), 33(7), 2573-2583

CODEN: MAMOBX; ISSN: 0024-9297

PUBLISHER: American Chemical Society

DOCUMENT TYPE: Journal

LANGUAGE: English

AB Polymer coatings often contain degrdn.-susceptible regions, and corrosion of the metallic substrate can occur directly underneath these regions. In this paper, the microstructure of model coating materials is investigated using at. force microscopy (AFM). Specifically, AFM is used to study heterogeneity in thin film blends of polystyrene (PS) and polybutadiene (PB) as a function of annealing time at 80 degree.C. PS/PB blend films with thicknesses of approx. 250 nm are prepd. by spin casting from solns. onto silicon substrates. Both topog. and phase imaging in tapping mode AFM are

performed on these films under ambient conditions and at different force levels using a silicon tip. For certain force levels, phase imaging provides good contrast between the phase-sepd. PS and PB regions, primarily because of the large compliance difference between the two materials. This contrast decreases with increasing annealing time because thermal oxidn. causes crosslinking in PB, and thus, the compliance of the PB region increases toward that of PS. Nanoscale indentation measurements are then made on the obsd. phase-sepd. regions to identify these regions as PS- and PB-rich and to better understand the influence of relative surface stiffness on the phase images. Cast and free-standing films of pure PS and pure PB are also studied as a function of annealing time using AFM, contact angle measurements, FTIR spectroscopy, DSC, and dynamic mech. anal. Results from studies of the individual PS and PB films are related to the AFM results for the blend films. The use of phase imaging for cure monitoring of polymers and for studies of chem. heterogeneous polymer systems is also discussed.

REFERENCE COUNT: 70

L3 ANSWER 15 OF 34 CAPLUS COPYRIGHT 2003 ACS on STN

ACCESSION NUMBER: 1998:527466 CAPLUS

TITLE: Neutron reflectivity of polymer blends.

AUTHOR(S): Braiewa, Robert J.; Weiss, R. A.; Karim, Alamgir; Ankner, John

CORPORATE SOURCE: Institute Materials Science, University Connecticut, Storrs, CT, 06269, USA

SOURCE: Book of Abstracts, 216th ACS National Meeting, Boston, August 23-27 (1998), PMSE-120. American Chemical Society: Washington, D. C.

CODEN: 66KYA2

DOCUMENT TYPE: Conference; Meeting Abstract

LANGUAGE: English

AB Sulfonated deuterated polystyrene, lithium salt (Li-dSPS), was prepd. with various sulfonation levels. Bilayers consisting of Li-dSPS with methylated polyamide (mPA) on a silicon substrate were prepd. by spin-coating the polymers from soln. The films were annealed at 95.degree.C for increasing periods of time. Neutron reflectivity expts. were conducted to analyze the width of the polymer/ionomer interface with varying annealing time at each sulfonation level. Exptl. data showed that the interfacial motion followed a kinetic model combining Fickian diffusion with a mol. crosslinking suppression of motion. Consts. derived from this kinetic model varied with sulfonation level.

L3 ANSWER 16 OF 34 CAPLUS COPYRIGHT 2003 ACS on STN

ACCESSION NUMBER: 1998:526657 CAPLUS

TITLE: "Phase separation of polymer blends with fillers"

AUTHOR(S): Karim, A.; Barnes, K. A.; Hobbie, E. K.; Nakatani, A. I.

CORPORATE SOURCE: Polymers Division, National Institute Standards and Technology, Gaithersburg, MD, 20899, USA

SOURCE: Book of Abstracts, 216th ACS National Meeting, Boston, August 23-27 (1998), PHYS-218. American Chemical Society: Washington, D. C.

CODEN: 66KYA2

DOCUMENT TYPE: Conference; Meeting Abstract

LANGUAGE: English

AB Phase sepn. of low mol. wt. polystyrene / polybutadiene (PS/PB) contg.fumed silica inclusions is characterized by optical and at. force microscopy (AFM) in the bulk (.apprx.microns) and in thin (.apprx.sub-micron) films. Measurements are conducted as a function of the fumed silica mass fraction (loading level .apprx. 0 to 6% by mass filler). The unfilled bulk blend exhibits an upper crit. soln. temp. with classic compn. dependent spinodal and nucleation regimes. Upon addn. of fumed silica, a competition between preferential wetting of the fumed silica and phase sepn. is apparent in the kinetics from the optical microscopy. A rich variety of phase behaviors is obsd. depending upon filler content and blend compn. Thin films of the same blends were prepd. by spin coating on HF etched silicon substrates from ultrasonicated toluene blend solns. The kinetics of film phase sepn. was observable in real time at room temp. using AFM. Results on the thin films are compared to the bulk measurements, and interpreted in terms of polymer-filler and filler-surface interactions.

L3 ANSWER 17 OF 34 CAPLUS COPYRIGHT 2003 ACS on STN

ACCESSION NUMBER: 1998:500866 CAPLUS

DOCUMENT NUMBER: 129:245954

TITLE: Spinodal Dewetting of Thin Polymer Films

AUTHOR(S): Xie, R.; Karim, A.; Douglas, J. F.; Han, C. C.; Weiss, R. A.

CORPORATE SOURCE: Polymer Science Program and Department of Chemical Engineering, University of Connecticut, Storrs, CT, 06269, USA

SOURCE: Physical Review Letters (1998), 81(6), 1251-1254

CODEN: PRLTAO; ISSN: 0031-9007

PUBLISHER: American Physical Society

DOCUMENT TYPE: Journal

LANGUAGE: English

AB Dewetting of polystyrene films on a silicon substrate is investigated as a function of film thickness h . We observe the nucleation of holes in the early stage of dewetting for relatively thick films ($h > 100$ ANG.), as obsd. previously, but the breakup of thinner films occurs through the growth of uniformly distributed surface undulations ("spinodal dewetting"). The av. amplitude Δh of these undulations increases exponentially up to the film rupture point where Δh becomes comparable to h , as predicted by a capillary wave instability model.

REFERENCE COUNT: 25 \

L3 ANSWER 18 OF 34 CAPLUS COPYRIGHT 2003 ACS on STN

ACCESSION NUMBER: 1998:397571 CAPLUS

DOCUMENT NUMBER: 129:96281

TITLE: Phase determination and inversion in specular neutron reflectometry

AUTHOR(S): Majkrzak, C. F.; Berk, N. F.; Dura, J. A.; Satija, S. K.; Karim, A.; Pedulla, J.; Deslattes, R. D.

CORPORATE SOURCE: NIST Center for Neutron Research, National Institute of Standards and Technology, Gaithersburg, MD, 20899-0001, USA

SOURCE: Physica B: Condensed Matter (Amsterdam) (1998), 248, 338-342

CODEN: PHYBE3; ISSN: 0921-4526

PUBLISHER: Elsevier Science B.V.

DOCUMENT TYPE: Journal

LANGUAGE: English

AB We present results testing the exptl. feasibility of recently discovered solns. of the dynamical phase problem for specular reflection. Using layers of Cu, Ni, and Mo as refs., the real and imaginary parts of the complex reflection amplitude were measured from neutron reflectivities for an asym. composite film consisting of deuterated polystyrene and Si. The reflection amplitude was also measured from neutron reflectivity without refs. for a sym. deuterated polystyrene film. These amplitudes were inverted using the Gel'fand-Levitan-Marchenko equation to produce scattering length d. profiles for the films studied. The inverted profiles compared reasonably well to the expected potentials. We conclude that such methods are practical with current instrumentation.

REFERENCE COUNT: 14

L3 ANSWER 19 OF 34 CAPLUS COPYRIGHT 2003 ACS on STN

ACCESSION NUMBER: 1998:397548 CAPLUS

DOCUMENT NUMBER: 129:95986

TITLE: Neutron reflectivity study of a chemically end-grafted polystyrene brush in a binary solvent mixture

AUTHOR(S): Satija, S. K.; Gallagher, P. D.; Karim, A.; Fetters, L. J.

CORPORATE SOURCE: NIST Center for Neutron Research, Gaithersburg, MD, USA

SOURCE: Physica B: Condensed Matter (Amsterdam) (1998), 248, 204-207

CODEN: PHYBE3; ISSN: 0921-4526

PUBLISHER: Elsevier Science B.V.

DOCUMENT TYPE: Journal

LANGUAGE: English

AB Neutron reflectivity measurements are taken on a deuterated polystyrene brush chem. end-grafted onto a Si surface and immersed in a mixt. of cyclohexane and MeOH. The solvents by themselves form a binary liq. mixt. which phase separates upon lowering the temp. The results for a solvent compn. rich in MeOH are reported. At high temps., the brush is collapsed as compared to its height measured in pure cyclohexane. However, upon lowering the temp., the brush height increases substantially, indicating that excess cyclohexane is adsorbed within the brush as the solvent phase sepn. temp. is approached. Varying the deuterium content of the cyclohexane indicates that the solvent compn. within the brush layer becomes nearly pure cyclohexane as the phase sepn. temp. is approached. REFERENCE COUNT: 14

L3 ANSWER 20 OF 34 CAPLUS COPYRIGHT 2003 ACS on STN

ACCESSION NUMBER: 1998:285922 CAPLUS

DOCUMENT NUMBER: 129:32497

TITLE: Direct inversion of specular reflectometry

AUTHOR(S): Majkrzak, C. F.; Berk, N. F.; Dura, J.; Satija, S. K.; Karim, A.; Pedulla, J.; Deslattes, R. D.

CORPORATE SOURCE: NIST Center for Neutron Research, National Institute of Standards and Technology, Gaithersburg, MD, 20899-0001, USA

SOURCE: Physica B: Condensed Matter (Amsterdam) (1998), Volume Date 1997, 241-243, 1101-1103

CODEN: PHYBE3; ISSN: 0921-4526

PUBLISHER: Elsevier Science B.V.

DOCUMENT TYPE: Journal

LANGUAGE: English

AB The authors briefly present measurements and anal. testing the exptl. feasibility of recently discovered solns. of the dynamical phase problem for specular reflection.

Complex reflection amplitudes were extd. from neutron reflectivities for an asym. Si-polymer film with metallic ref. layers and from a sym. polymer film without refs.

Scattering length d. profiles for the films studied were obtained by inverting the measured amplitudes. REFERENCE COUNT: 4

L3 ANSWER 21 OF 34 CAPLUS COPYRIGHT 2003 ACS on STN

ACCESSION NUMBER: 1998:22077 CAPLUS

DOCUMENT NUMBER: 128:48888

TITLE: Control of Dewetting of Polystyrene Films through Sulfonation and Metal Complexation

AUTHOR(S): Feng, Yi; Karim, Alamgir; Weiss, Robert A.; Douglas, Jack F.; Han, Charles C.

CORPORATE SOURCE: Institute of Materials Science, University of Connecticut, Storrs, CT, 06269, USA

SOURCE: Macromolecules (1998), 31(2), 484-493

CODEN: MAMOBX; ISSN: 0024-9297

PUBLISHER: American Chemical Society

DOCUMENT TYPE: Journal

LANGUAGE: English

AB The dewetting of low-mol.-wt. sulfonated polystyrene ionomers (SPS) on inorg. silicon oxide substrates is compared with unmodified polystyrene (PS, $M_w = 4000$) using a combination of X-ray reflectivity, optical and at. force microscopy. The amts. of sulfonate group and metal counterion (Li^+ , Zn^{2+}) were both varied in our study. Unlike unmodified PS, which readily dewets the substrate, a strong inhibition of dewetting occurs for low sulfonation (equiv. 2.3 mol %), and no apparent dewetting was found for high sulfonation (gtoreq. 7 mol %). For ZnSPS, dewetting was not obsd. in any of the films, even for those with very low sulfonation. Comparison with bulk rheol. data suggests that inter- and intramol. ionomer complexation may be important in retarding the dewetting process (a nonequil. effect), in addn. to an increased wettability arising from long-range electrostatic polymer-surface interactions.

REFERENCE COUNT: 45

L3 ANSWER 22 OF 34 CAPLUS COPYRIGHT 2003 ACS on STN

ACCESSION NUMBER: 1997:487892 CAPLUS

TITLE: Models of the influence of excluded volume on the formation of polymer layers.

AUTHOR(S): Douglas, Jack F.; Lipman, Robert; Karim, Alamgir; Granick, Steve

CORPORATE SOURCE: Polymers Division, NIST, Gaithersburg, MD, 20899, USA

SOURCE: Book of Abstracts, 214th ACS National Meeting, Las Vegas, NV, September 7-11 (1997), MACR-051. American Chemical Society: Washington, D. C.

CODEN: 64RNAO

DOCUMENT TYPE: Conference; Meeting Abstract

LANGUAGE: English

AB The control of the formation of polymer layers is essential for many applications. Polymer layer properties (roughness, wettability, mech. properties) often reflect the growth history of the film both in the case of end-grafted and adsorbed polymer layers. Random sequential adsorption models of polymer deposition onto a substrate are introduced to obtain insight into the role of excluded vol. interactions and chain deformability on the structure of polymer layers. These models are compared with recent measurements on the growth and properties of end-grafted polymer layers, polymers adsorbed on surfaces with highly attractive polymer-surface interactions, and dendrimer layers having different generation nos. spuncast on silicon wafers.

L3 ANSWER 23 OF 34 CAPLUS COPYRIGHT 2003 ACS on STN

ACCESSION NUMBER: 1997:487882 CAPLUS

TITLE: End grafted polystyrene brushes in a critical binary mixture.

AUTHOR(S): Satija, S. K.; Gallagher, P. D.; Karim, A.; Fetters, L. J.

CORPORATE SOURCE: Reactor Radiation Division, NIST, Gaithersburg, MD, 20854, USA

SOURCE: Book of Abstracts, 214th ACS National Meeting, Las Vegas, NV, September 7-11 (1997), MACR-041. American

Chemical Society: Washington, D. C.

CODEN: 64RNAO

DOCUMENT TYPE: Conference; Meeting Abstract

LANGUAGE: English

AB We report neutron reflectivity measurements of polymer concn. profile of end-grafted polystyrene grafted "brushes" on silicon when immeresd in mixts. of cyclohexane and methanol of various proportions (including the crit. compn.) and at different temps. For single phase mixts. with compns. rich in methanol, the brush is very collapsed. However, the brush height increases on decreasing the temp. indicating that excess cyclohexane is adsorbed near the brush as cyclohexane-methanol phase sepn. temp. is approached. Single phase mixts. with a small amt. of added methanol show a surprising stretching of the polymer brush, with brush heights that exceed those measured in pure cyclohexane at the same temps. This suggests that the adsorption of methanol to the surface near the brush plays a role in the stretching of the end grafted chains.

L3 ANSWER 24 OF 34 CAPLUS COPYRIGHT 2003 ACS on STN

ACCESSION NUMBER: 1997:279537 CAPLUS

DOCUMENT NUMBER: 126:277956

TITLE: Neutron Reflection Studies on Segment Distribution of Block Chains in Lamellar Microphase-Separated Structures

AUTHOR(S): Torikai, Naoya; Noda, Ichiro; Karim, Alamgir; Satija, Sushil K.; Han, Charles C.; Matsushita, Yushu; Kawakatsu, Toshihiro

CORPORATE SOURCE: Department of Applied Chemistry Graduate School of Engineering, Nagoya University, Nagoya, 464-01, Japan

SOURCE: Macromolecules (1997), 30(10), 2907-2914

CODEN: MAMOBX; ISSN: 0024-9297

PUBLISHER: American Chemical Society

DOCUMENT TYPE: Journal

LANGUAGE: English

AB Segment distribution of styrene in an alternating lamellar structure of styrene-2-vinylpyridine diblock copolymer was investigated by neutron reflection. Block copolymers having three types of deuterium-labeled styrene block chains consisting of fully labeled, partially junction-labeled, and partially end-labeled block chains were used in this study. The degree of junction and end labeling was varied to obtain a more complete picture of segment distribution. Spin-coated thin films of these block copolymers on silicon wafers exhibited lamellar structures which were oriented perfectly parallel to the silicon surface. The results indicate that the poly(2-vinylpyridine) block chain exists at the silicon surface, while polystyrene appears at the air surface in all of the film specimens. The segment distribution at the interface between polystyrene and poly(2-vinylpyridine) lamellae could be well described by an error function. The thickness of the lamellar interface (defined as a full-width half-max. value of the error function) is evaluated to be about 4.5 nm, suggesting that the blocks are strongly segregated. Accordingly, the segments of a block chain in the vicinity of the chem. junction point between two block chains are detd. to be strongly localized near the lamellar interface. However, the free ends are broadly distributed throughout the lamellar microdomain with their net max. distribution at the center of each microdomain. Such an end-segment distribution of the block chains is shown to be consistent with predictions from a mean field theory.

L3 ANSWER 25 OF 34 CAPLUS COPYRIGHT 2003 ACS on STN

ACCESSION NUMBER: 1996:334672 CAPLUS

DOCUMENT NUMBER: 125:12257

TITLE: Dimensional crossover in the phase separation kinetics of thin polymer blend films

AUTHOR(S): Sung, L.; Karim, A.; Douglas, J. F.; Han, C. C.

CORPORATE SOURCE: Polymers Division, National Inst. Standards and Technology, Gaithersburg, MD, 20899, USA

SOURCE: Physical Review Letters (1996), 76(23), 4368-4371

CODEN: PRLTAO; ISSN: 0031-9007

PUBLISHER: American Physical Society

DOCUMENT TYPE: Journal

LANGUAGE: English

AB The kinetics of phase sepn. in thin films of polystyrene-polybutadiene blends on a silicon substrate is examd. by optical microscopy of the free film boundary. Observations on 1000- and 200-Å films are consistent with a crossover from three- to two-dimensional spinodal decompn. kinetics in the (off-crit.) viscous hydrodynamic regime. In this stage of phase sepn. the exponent n , characterizing the scale $R(t)$ apprx. t^n of the coarsening pattern, is predicted to change from 1 to a value near 0.46 upon lowering the dimensionality.

L3 ANSWER 26 OF 34 CAPLUS COPYRIGHT 2003 ACS on STN

ACCESSION NUMBER: 1996:320755 CAPLUS

DOCUMENT NUMBER: 125:34740

TITLE: Comparative swelling of gels and polymer brush layers

AUTHOR(S): Karim, A.; Douglas, J. F.; Horkay, F.; Fetters, L. J.; Satija, S. K.

CORPORATE SOURCE: National Institute of Standards and Technology,
Gaithersburg, MD, 20899, USA

SOURCE: Physica B: Condensed Matter (Amsterdam) (1996), 221(1-4), 331-336

CODEN: PHYBE3; ISSN: 0921-4526

PUBLISHER: Elsevier

DOCUMENT TYPE: Journal

LANGUAGE: English

AB The swelling of chem. end-grafted (to Si wafer) polystyrene brushes in a marginal solvent is investigated as a function of mol. wt. M_w , grafting d. σ , and solvent quality $\tau = (T - \theta)/T$ by specular neutron reflection and these swelling results are compared to previous measurements on swollen polymer networks. This comparison is motivated by the view of a polymer brush as a variety of "gel" where the crosslinks (grafting points) are constrained to lie on a surface. In accordance with this analogy, the temp. dependence of the brush and the network swelling is found to be qual. similar and the relative degree of brush and network swelling is found to diminish with an increase of σ and the crosslink d. ν , resp. The network swelling data are taken from a previous study by Zrinyi and Horkay who found an apparent universal master curve describing the swelling of uncharged gels with temp. An attempt to describe the swelling of polymer brushes having a range of mol. wts. by similar reduced variables led to a fairly good description of the brush swelling data, but the scaling curves for the gels and the brushes do not exactly coincide.

L3 ANSWER 27 OF 34 CAPLUS COPYRIGHT 2003 ACS on STN

ACCESSION NUMBER: 1996:320750 CAPLUS

DOCUMENT NUMBER: 125:60258

TITLE: Neutron reflection studies of phase separation and transesterification in thin film polymer blends

AUTHOR(S): Wong, Apollo P. Y.; Karim, Alamgir; Han, Charles C.

CORPORATE SOURCE: Intense Pulse Neutron Source, Argonne National Laboratory,
Argonne, IL, 60439, USA

SOURCE: Physica B: Condensed Matter (Amsterdam) (1996), 221(1-4), 301-305

CODEN: PHYBE3; ISSN: 0921-4526

PUBLISHER: Elsevier

DOCUMENT TYPE: Journal

LANGUAGE: English

AB Neutron reflection is used to investigate the evolution of structure and surface segregation in thin films of a binary polymer blend, deuterated poly(Me methacrylate) (dPMMA) and polycarbonate (PC). This blend film simultaneously undergoes phase sepn. and reaction by trans-esterification. A large increase of the crit. scattering length d. in the first few minutes of annealing at 200.degree.C reflected the rapid layering of the dPMMA at the silicon surface. Further annealing progressively smeared out the specular peak in favor of the off-specular signal in the form of a butterfly pattern reflecting the in-plane anisotropy of the thin film phase sepn.

L3 ANSWER 28 OF 34 CAPLUS COPYRIGHT 2003 ACS on STN

ACCESSION NUMBER: 1996:221535 CAPLUS

TITLE: "Phase separation in thin film polymer blends with and without block copolymer additives"

AUTHOR(S): *Sung, L.; Karim, A.; Douglas, J. F.; Han, C. C.*

CORPORATE SOURCE: Polymers Division, National Institute Standards and Technology, Gaithersburg, MD, 20899, USA

SOURCE: **Book of Abstracts, 211th ACS National Meeting, New Orleans, LA, March 24-28 (1996), PMSE-059. American Chemical Society: Washington, D. C.**

CODEN: 62PIAJ

DOCUMENT TYPE: Conference; Meeting Abstract

LANGUAGE: English

AB The kinetics of phase sepn. of thin polymer blend films of deuterated polystyrene (PSD) and polybutadiene (PB) on a silicon substrate is examd. by optical microscopy. Phase sepn. within the film induces pattern formation at the free boundary and the characteristic wavelength, $R(t)$, as a function of time is obtained by Fast Fourier Transformation of the optical data for the intermediate and late stage phase sepn. A crossover from three-dimensional bulk-like to near two-dimensional phase sepn. kinetics is obsd. by varying the blend film thickness from 1000 Å to approx. 200 Å. The addn. of a small amt. (ltoreq. 1%) of a PSD-PB sym. diblock copolymer to the blend is found to strongly suppress the surface pattern formation in the thin film.

L3 ANSWER 29 OF 34 CAPLUS COPYRIGHT 2003 ACS on STN

ACCESSION NUMBER: 1995:871384 CAPLUS

DOCUMENT NUMBER: 123:287097

TITLE: Self-organization of polymer brush layers in a poor solvent

AUTHOR(S): *Karim, A.; Tsukruk, V. V.; Douglas, J. F.; Satija, S. K.; Fetters, L. J.; Reneker, D. H.; Foster, M. D.*

CORPORATE SOURCE: National Inst. Standards Technology, Gaithersburg, MD, 20899, USA

SOURCE: *Journal de Physique II* (1995), 5(10), 1441-56

CODEN: JPAHER; ISSN: 1155-4312

PUBLISHER: Editions de Physique

DOCUMENT TYPE: Journal

LANGUAGE: English

AB Synthesis of densely grafted polymer brushes onto Si substrates from good solvent polymer solns. is difficult when the surface interaction is only weakly attractive because of the strong steric repulsion between the polymer chains. To circumvent this difficulty we graft polymer layers in a poor solvent to exploit attractive polymer-polymer interactions which largely nullify the repulsive steric interactions. This simple strategy gives rise to densely grafted and homogeneous polymer brush layers. Model end-grafted polystyrene chains ($M_w = 105,000$) are prepd. in the poor solvent cyclohexane (9.5.degree.) where the chains are chem. attached to the surface utilizing a trichlorosilane end group. Polished silicon wafers were then exposed to the reactive polymer solns. for a series of "induction times" τ_i and the evolving layer was characterized by X-ray

reflectivity and at. force microscopy. Distinct morphologies were found depending on τ . For short τ , corresponding to a grafting d. $< 5 \text{ mg/m}^2$, the grafted layer formed an inhomogeneous island-like structure. At intermediate τ , where the coverage became percolating, a surface pattern developed which appeared similar to spinodal decompn. in bulk soln. Finally, after sufficiently long τ , a dense and nearly homogeneous layer with a sharp interface was formed which did not exhibit surface pattern formation. The stages of brush growth were discussed qual. in terms of a random deposition model.

L3 ANSWER 30 OF 34 CAPLUS COPYRIGHT 2003 ACS on STN

ACCESSION NUMBER: 1995:734679 CAPLUS

DOCUMENT NUMBER: 123:287630

TITLE: Concentration profiles of end anchored polymer brushes under variable solvent quality

AUTHOR(S): Satija, S. K.; Karim, A.; Douglas, J. F.

CORPORATE SOURCE: National Inst. Standards and Technology, Gaithersburg, MD, USA

SOURCE: Polymeric Materials Science and Engineering (1994), 71, 277-8

CODEN: PMSDGG; ISSN: 0743-0515

PUBLISHER: American Chemical Society

DOCUMENT TYPE: Journal

LANGUAGE: English

AB Trichlorosilyl-terminated polystyrene was end-grafted on to a silicon wafer. The concn. profiles of the end-grafted polystyrene brush were detd. when immersed in a good or poor solvent. A notable concn. of the brush was seen in the poor solvent. No depletion zone of the polymer at the grafted surface was obsd.

L3 ANSWER 31 OF 34 CAPLUS COPYRIGHT 2003 ACS on STN

ACCESSION NUMBER: 1994:580390 CAPLUS

DOCUMENT NUMBER: 121:180390

TITLE: Chemical grafting of silane end-functionalized polymer on silicon surfaces

AUTHOR: Karim, A.; Satija, S.K.; Orts, W.; Ankner, J. F.; Majkrzak, C.F.; Fetters, L.J.

CORPORATE SOURCE: React. Radiat. Div., Nat. Inst. Stand. Technol., Gaithersburg, MD, 20899, USA

SOURCE: Materials Research Society Symposium Proceedings (1993), 304(Polymer/Inorganic Interfaces), 149-54

CODEN: MRSPDH; ISSN: 0272-9172

DOCUMENT TYPE: Journal

LANGUAGE: English

AB X-ray and neutron reflectivity was used to det. the kinetics of adsorption and characterize the concn. profile of a low mol. wt. trichlorosilane end-functionalized polystyrene adsorbed onto polished silicon wafers. Higher adsorbed amts. were obtained from a cyclohexane soln. of the polymer rather than toluene, with kinetics that followed a stretched exponential behavior. For moderately high grafting densities the polymer concn. profile in deuterated toluene (a good solvent) was best modeled using a small tailed parabola. In deuterated cyclohexane (a poor solvent) the brush profile steepened

but was substantially smoother than a step, while in D2O (a non-solvent) it became step-like.

L3 ANSWER 32 OF 34 CAPLUS COPYRIGHT 2003 ACS on STN

ACCESSION NUMBER: 1994:246190 CAPLUS

DOCUMENT NUMBER: 120:246190

TITLE: Adsorption of End-Functionalized Polystyrene on Model Textured Surfaces

AUTHOR(S): Singh, N.; Karim, A.; Bates, F. S.; Tirrell, M.; Furusawa, K.

CORPORATE SOURCE: Department of Chemical Engineering and Materials Science, University of Minnesota, Minneapolis, MN, 55455, USA

SOURCE: Macromolecules (1994), 27(9), 2586-94

CODEN: MAMOBX; ISSN: 0024-9297

DOCUMENT TYPE: Journal

LANGUAGE: English

AB Adsorption of iminium ion end-functionalized polystyrene on model rough surfaces was investigated. The model surfaces were prepd. by spin coating a soln. of colloidal silica beads on aluminum-coated silicon surfaces. At. force microscopy and SEM of the surfaces revealed a nearly hexagonal packing of beads. Static secondary ion mass spectroscopy and XPS were used to measure relative changes in the adsorbed amts. on the model surfaces compared to a flat surface. The authors observe a significant enhancement of adsorption when the bead to polymer radius (ρ/R_g) is of order unity. For ρ/R_g mchgt. 1, the adsorbed amts. approach that on the smooth surfaces, whereas for $\rho/R_g < 1$, the adsorption is substantially reduced. The enhancement in adsorption is interpreted as a favorable redn. in crowding or stretching energy on adsorption, whereas the redn. is understood in terms of topol. induced steric hindrance to adsorption.

L3 ANSWER 33 OF 34 CAPLUS COPYRIGHT 2003 ACS on STN

ACCESSION NUMBER: 1992:195201 CAPLUS

DOCUMENT NUMBER: 116:195201

TITLE: Interfacial segment density profiles of end-anchored polymers in a melt

AUTHOR(S): Jones, Richard A. L.; Norton, Laura J.; Shull, Kenneth R.; Kramer, Edward J.; Felcher, Gian P.; Karim, Alamgir; Fetters, Lewis J.

CORPORATE SOURCE: Dep. Phys., Cambridge Univ., Cambridge, CB4 0HE, UK

SOURCE: Macromolecules (1992), 25(9), 2359-68

CODEN: MAMOBX; ISSN: 0024-9297

DOCUMENT TYPE: Journal

LANGUAGE: English

AB The segment-d. profile of Me₃Si-end-functionalized deuterated polystyrene (EF-dPS) anchored in a surrounding melt of hydrogenated polystyrene (I) to an interface with Si was detd. by neutron reflectometry. Thin films of mixts. with various vol.-fractions of the EF-dPS and hydrogenated I were spun-cast from PhMe solns. onto the Si. These films as cast were uniform as a function of depth. After heating to 184.degree. for approx. 1 day to allow equil. segregation to be achieved in the films, neutron reflection measurements were performed. The EF-dPS segment d.-profiles $\phi(z)$ needed to fit the reflectivity data showed a high ϕ at the Si interface, which increased to a max. approx. 10 nm away from the interface and then fell monotonically to the bulk segment d.

phi.infin.. The interface excess detd. by integration of these profiles was in excellent agreement with that directly detd. by forward recoil spectrometry on the same samples. The form of the profiles was consistent with the predictions of a self-consistent mean field theory if, in addn. to a large attachment free energy of the end group to the Si, there was a weak preferential attraction of the Si for the more polarizable hydrogenated I segments relative to the less polarizable deuterated I segments. The small end-group was sufficient to drive substantial adsorption of deuterated I from a blend of the EF-dPS and hydrogenated I to an interface of a Si substrate.

L3 ANSWER 34 OF 34 CAPLUS COPYRIGHT 2003 ACS on STN

ACCESSION NUMBER: 1991:560760 CAPLUS

DOCUMENT NUMBER: 115:160760

TITLE: Preparation and characterization of thin polymer bilayer films by neutron reflection

AUTHOR(S): Karim, A.; Arendt, B. H.; Felcher, G. P.; Russell, T. P.

CORPORATE SOURCE: Argonne Natl. Lab., Argonne, IL, 60439, USA

SOURCE: Thin Solid Films (1991), 202(2), 345-50

CODEN: THSFAP; ISSN: 0040-6090

DOCUMENT TYPE: Journal

LANGUAGE: English

AB Neutron reflection is used to study the concn. profile at the interface between 2 thin layers of (deuterated) polystyrene. The 1st layer was prepd. by spin casting on a Si substrate; the 2nd film was similarly prepd. on a different substrate, floated off in water and placed over the 1st film. As prepd., the polymer- polymer interface has a contaminant film of water with .apprx.0.26 mg m⁻² surface coverage, which was removed by annealing under vacuum at temps. close to the glass transition temp. of the polymer. The annealed bilayered specimen did not show any trace of interdiffusion between the 2 polymers, even when the polymers are chem. identical.